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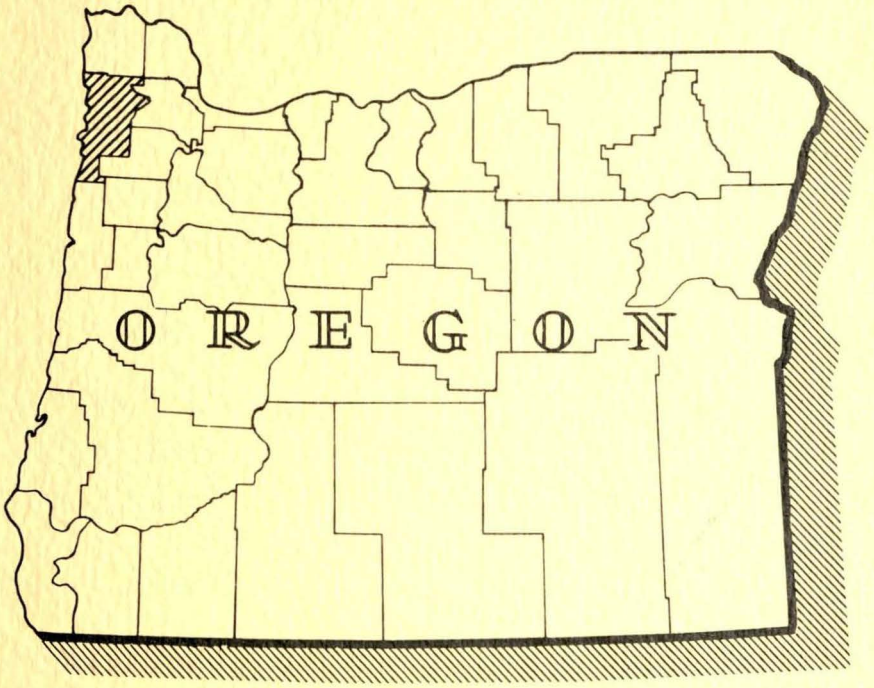
FOREST STATISTICS FOR TILLAMOOK CO., OREGON

FOREST SURVEY REPORT NO. 130



PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION
R. W. COWLIN, DIRECTOR

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

PORTLAND, OREGON

DECEMBER 1957

PREPARED BY

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Acknowledgment is made of cooperation from public and private agencies in furnishing timber cutting and ownership records, and from those on the staff of the Siuslaw National Forest who participated in the collection of field data.

Special acknowledgment is due the Oregon State Board of Forestry for assistance in surveying the Tillamook Burn and for contributing maps, regeneration data, and historical information.

Forest Survey Report No. 130

FOREST STATISTICS

FOR

TILLAMOOK COUNTY, OREGON

by

M. P. Twerdal
and
C. D. MacLean

December 1957

PACIFIC NORTHWEST
FOREST AND RANGE EXPERIMENT STATION
R. W. Cowlin, Director Portland, Oregon

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

PREFACE

This publication summarizes in statistical form the results of a second reinventory of the forests in Tillamook County, Oreg., made in 1955. This reinventory is a part of the maintenance phase of the Forest Survey, a nationwide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928, amended June 25, 1949. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the timber and other products on them, to ascertain rates of forest growth and depletion, to estimate present consumption of timber products, and to analyze and make available survey information needed in the formulation of forest policies and programs.

The Forest Survey is conducted in the various forest regions of the Nation by the regional forest experiment stations of the Forest Service. In the Pacific Northwest region of Oregon and Washington, it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oreg.

Under the initial phase of the Forest Survey, the forests of Tillamook County were inventoried in 1930. Later, the inventory was adjusted to 1932-33, and the report "Forest Statistics for Tillamook County, Oregon" and a detailed forest type map on a 1-inch-to-the-mile scale were released. In 1942, the first reinventory of the county's forests was made and a revised statistical report and forest type map resulted.

Following computation of data from the second reinventory, the forest type map was revised again and is available on scales of 1 and 2 inches to the mile.[1/]

1/ Prints of the forest type map are available at cost of blueprinting. For information write Director, Pacific Northwest Forest and Range Experiment Station, P. O. Box 4059, Portland 8, Oregon.

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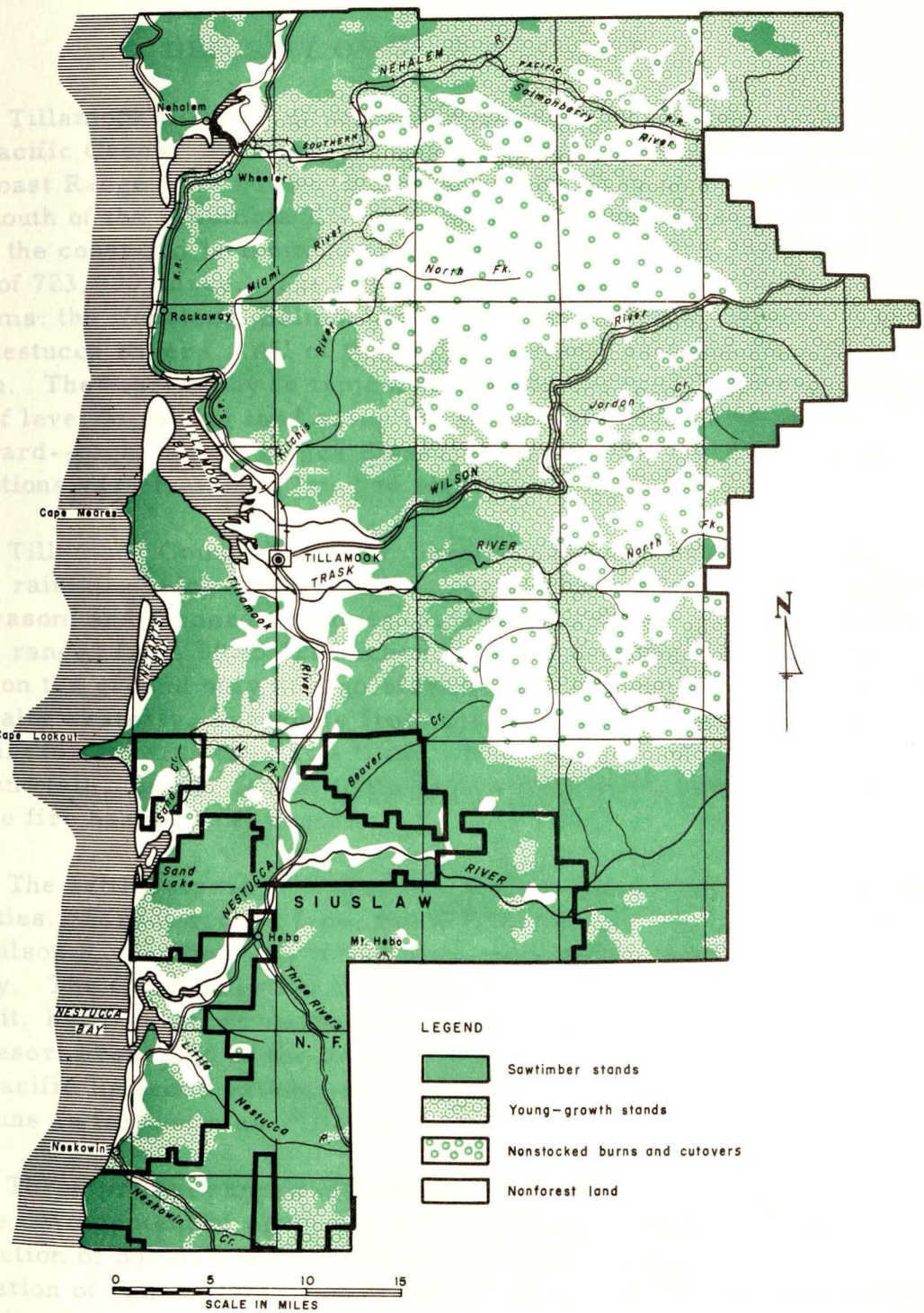
FOREST STAND–SIZE AND CONDITION CLASSES

TILLAMOOK COUNTY, OREGON

1955



DESCRIPTION OF THE COUNTY

Tillamook County, situated in northwestern Oregon, fronts on the Pacific Ocean. Its eastern boundary roughly follows the crest of the Coast Range. Its northern boundary lies 25 to 30 miles south of the mouth of the Columbia River. The county extends about 50 miles along the coast and is from 10 to 30 miles wide, with a total land area of 723,000 acres. The area is drained by seven principal streams: the Nehalem, Salmonberry, Miami, Kilchis, Wilson, Trask, and Nestucca Rivers. All of these flow directly into the Pacific Ocean. The topography is typical of coastal terrain, with a narrow belt of level to rolling land along the immediate coast and--to the eastward--high, sharp ridges dissected by narrow stream valleys. Elevations vary from sea level to slightly above 3,500 feet.

Tillamook County has a temperate climate characterized by heavy rainfall during the fall and winter months; a long, humid growing season; and moderate temperature fluctuations. Annual precipitation ranges from 80 to 120 inches. Snows are infrequent and remain on the ground only at high elevations. Prevailing winds are generally westerly, but winds from the interior occasionally blow steadily for several days at a time. When this happens during summer and fall months, forest fuels dry rapidly and a limited period of severe fire hazard may result.

The settled areas of Tillamook County have good transportation facilities. Direct access from the Willamette Valley is provided by the Wilson River Highway, which extends east and west across the county. The Coast Highway traverses the length of the county and, from it, hard-surfaced roads provide access to numerous beaches and resort areas and to the broader valleys. A branch of the Southern Pacific Railroad extends across the northern part of the county and runs as far south as Tillamook.

Three primary types of land use are found in Tillamook County--(1) the development of agricultural lands in the coastal valleys for production of pasture and hay for a large dairy industry, (2) the utilization of timber from forest lands, and (3) the use of such recreational assets as fishing streams, sandy beaches, and some 50 miles

of scenic coast. In spite of the devastation of large parts of the county by repeated fires, the forests still provide the major source of income. The most severe fire loss occurred in 1933 when the great Tillamook Burn fire swept over 245,000 acres in northwestern Oregon and devastated 149,000 acres of Tillamook County's finest sawtimber. In the Saddle Mountain fire of 1939, much of the Tillamook fire area was reburned, and an additional 17,000 acres of the county's old-growth timber was killed. After a third fire (1945) had reburned large sections of the old burn and further extended its perimeter, the land had been denuded of most of its sawtimber.

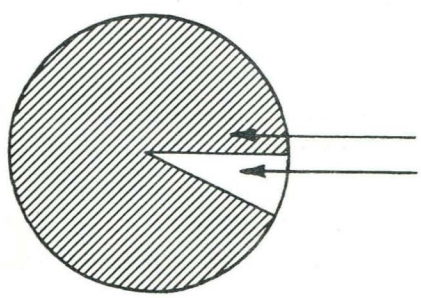
The aftermath of this last fire and the resultant publicity was a public demand for a program designed to prevent the recurrence of such holocausts. Over a period of years, following the 1933 fire, the State had been acquiring from the county a large acreage of tax-foreclosed forest land in the Tillamook Burn. When funds became available in 1949, an intensive examination of these lands was undertaken. From data gathered at that time, plans were drawn for rehabilitation. A vigorous program was then initiated and continued to date; it includes snag falling, reforestation through aerial seeding on some areas and planting on others, and development of a fire-protection system.

The foregoing history of severe fires and subsequent rehabilitation explains the drastic change in forest stand-size distribution in the county during the past two decades.

SIGNIFICANT FINDINGS IN THE FOREST INVENTORY

Land Classification

Tillamook is predominantly a forest county. Ninety-three percent of the total area is forest land. Of the remaining area, 80 percent is in agricultural use. The city of Tillamook, the adjacent naval base, and a small amount of coastal wasteland--mostly sand or brush--account for the nonforest area not used for agriculture.



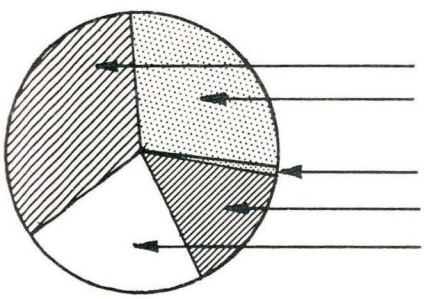
Class	Thousand acres	Percent
Forest	670	93
Nonforest	53	7
Total	723	100

Over 99 percent of the forested area in the county (666,000 acres) is commercial forest land. The remaining fraction of a percent consists of 4,000 acres of productive but reserved land, chiefly State park and Federal lighthouse reserve. A roadside strip of variable width, adjacent to the Wilson River Highway, has been set aside by the State for park development.

Commercial Forest Land Area

Major Types

The forests on commercial forest lands are composed of five major types: Douglas-fir, hemlock-Sitka spruce, fir-spruce, lodgepole pine, and hardwoods.



Major type	Thousand acres	Percent
Douglas-fir	227	34
Hemlock-Sitka spruce	184	28
Other softwoods	8	1
Hardwoods	101	15
Nonstocked	146	22
Total	666	100

Hemlock-Sitka spruce stands predominate throughout the coastal area, whereas the Douglas-fir type is characteristic of the interior parts of the county. Stands of both of these types are intermixed with hardwood types of red alder. "Other softwoods" includes small acreages each of stands of Pacific silver fir and noble fir on some of the higher ridges, lodgepole pine along the coast, western redcedar, grand fir, and plantations of Port-Orford-cedar. Finally, as a result of the large fires, 146,000 acres are nonstocked.

Stand-Size Class

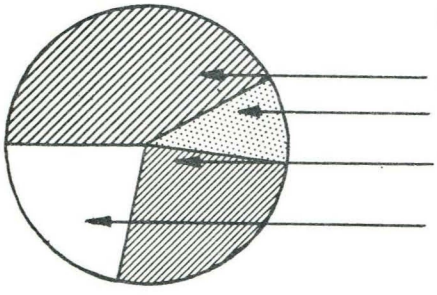
Fire and logging have reduced the area of sawtimber stands to 276,000 acres. Of this area, 183,000 acres are occupied by stands

classed as large sawtimber (21 inches d.b.h. and larger), and 93,000 acres by stands classed as small sawtimber (11.0-20.9 inches d.b.h.).

The area of large old-growth Douglas-fir, which once covered the major part of the county, has been reduced to 9,000 acres, located principally in the upper basin of the Nestucca River drainage.

A history of early fires accounts for large blocks of large young-growth Douglas-fir sawtimber in the Nestucca River area and smaller blocks scattered throughout the central part of the county between the Tillamook Burn and the coast. This large young-growth Douglas-fir is found on 74,000 acres. Large Sitka spruce and hemlock sawtimber covers 99,000 acres of the coastal strip. A few small patches of Pacific silver and noble fir scattered along the crest of the coast range account for the remaining 1,000 acres of large sawtimber.

Hardwood stands of red alder occupy 42 percent of the small sawtimber acreage; Douglas-fir stands cover 33 percent, and the remaining 25 percent is covered by Sitka spruce and hemlock types.



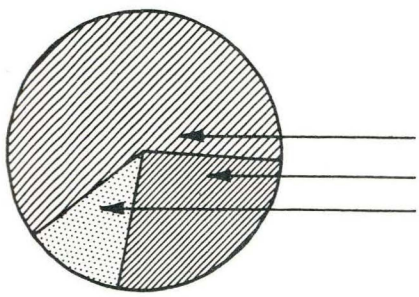
Stand size	Thousand acres	Percent
Sawtimber	276	42
Poletimber	68	10
Seedling & sapling	176	26
Nonstocked	146	22
Total	666	100

Most of the young stands of poletimber size are located to the north and west of the Tillamook Burn; the stands of seedling and sapling size are largely in the Burn. Nearly all of the nonstocked acreage is in the Burn, but there are a few scattered small tracts of nonstocked cutover land and burns in other parts of the county.

Stocking of Young-Growth Stands

The State has an active planting and seeding program in the Tillamook Burn, but progress in this direction has been hampered by salvage logging activities. Much of the nonstocked area is either still being logged or has not yet been turned over to the State because of potential relogging value. Because of damage to the reproduction, planting or seeding is impractical in areas where logging is not yet completed. Some areas have been relogged as many as four times. Rehabilitation work, however, is going ahead on high-priority areas as soon as logging is completed. To date, about 40,000 acres have been seeded and 23,000 acres planted.

In general, the young-growth stands--which include young-growth sawtimber, poletimber, and seedlings and saplings--are adequately stocked; 88 percent are in either the well- or the medium-stocked class. Stands rated as poorly stocked are found chiefly in the Burn.



Stocking class	Thousand acres	Percent
Well	250	61
Medium	112	27
Poor	48	12
Total	410	100

In classifying young-growth stands for stocking, all commercial tree species and tree sizes are considered. Thus, in this county, stocking of Douglas-fir stands may frequently be augmented by red alder or bigleaf maple. Likewise, the stocking of many hardwood stands is increased by Douglas-fir, hemlock, or other softwood species. A young-growth sawtimber stand may be classed as well stocked on the basis of sawtimber-size trees, poletimber, seedlings and saplings, or any combination of these tree sizes.

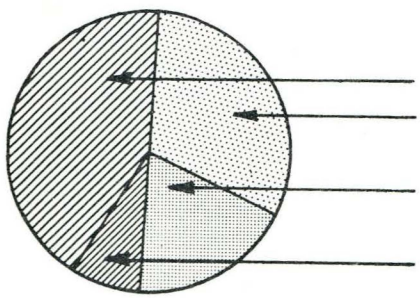
Commercial Forest Land Timber Volumes

The volume of live sawtimber trees (11 inches d.b.h. and larger) on commercial forest land is estimated to be 13,838

million board-feet, log scale, Scribner rule; or 14,997 million board-feet, International 1/4-inch rule. Of the total Scribner volume, 99 percent (13,745 million board-feet) is in sawtimber stands; the remaining 93 million board-feet is in scattered sawtimber trees in the overstory of young stands and in widely scattered sawtimber trees in nonstocked areas. Volume of growing stock (live trees 5 inches d.b.h. and larger, including trees of both poletimber and sawtimber size) is estimated to be 2,508 million cubic feet. Of this volume, 97 percent (2,431 million cubic feet) is in sawtimber stands, and 3 percent (77 million cubic feet) is in poletimber stands, the overstory of seedling and sapling stands, and trees in nonstocked areas.

Volume of Sawtimber by Species

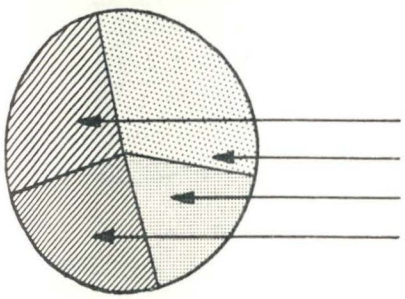
Live sawtimber volume (Scribner) of softwood species totals 12,714 million board-feet; the volume of hardwood species is 1,124 million board-feet. Douglas-fir, the dominant species, accounts for more than two-fifths of the total volume, and western hemlock accounts for nearly a third. Although the only other softwood of appreciable volume is Sitka spruce, there are small volumes of western redcedar, lodgepole pine, and Pacific silver fir. Except for a small amount of bigleaf maple, the hardwood volume is all red alder.



Species	Sawtimber Million bd. ft. (Scribner)	Percent
Douglas-fir	5,730	42
Western hemlock	4,333	31
Other softwoods	2,651	19
Hardwoods	1,124	8
Total	13,838	100

Volume of Sawtimber by Diameter Classes

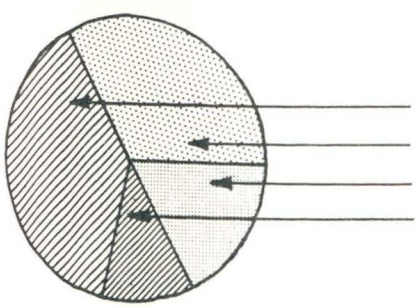
Sawtimber volumes are fairly evenly distributed throughout four 10-inch diameter classes.



Diameter class	Million bd.-ft.	Percent
11.0-20.9	3,660	26
21.0-30.9	4,253	31
31.0-40.9	2,469	18
41.0 +	3,456	25
Total	13,838	100

Volume of Growing Stock by Species

Growing-stock volume includes both poletimber-size trees (5.0-10.9 inches d.b.h.) and sawtimber-size trees (11 inches d.b.h. and larger). Of the total growing stock, 6 percent is in poletimber trees; the remainder, in sawtimber trees.

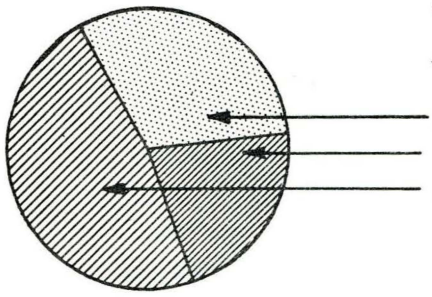


Species	Growing stock Million cu. ft.	Percent
Douglas-fir	980	39
Western hemlock	820	33
Other softwoods	430	17
Hardwoods	278	11
Total	2,508	100

Forest Ownership

Commercial Forest Land

Almost one-half of the commercial forest land in Tillamook County is in State ownership. Since the early 1940's, the State has acquired large areas in the Tillamook Burn, mostly through donation by the county of tax-delinquent land. Because of timber reservations and contracts in force at the time of donation, clear title to much of the land has been delayed until salvage logging has been completed.



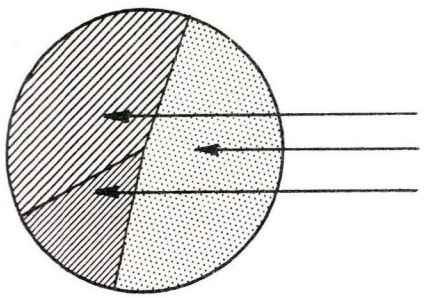
Ownership class	Thousand acres	Percent
Private	209	31
Federal	143	22
State and other public	314	47
Total	666	100

Over the years, Federal ownership has remained stable at slightly over one-fifth of the total forest land area. Nearly two-thirds of this Federal land is within the boundaries of the Siuslaw National Forest. The remaining third is public domain, revested-grant, and other lands administered by the Bureau of Land Management. The county and municipal governments combined own about 1 percent of the total forest land area.

Forty percent of the area of sawtimber stands is privately owned; 45 percent is federally owned; and 15 percent is in State, county, and municipal ownerships.

Sawtimber Volume

Nearly half of the live sawtimber volume is federally owned. Most of the remainder is privately held, and some is in State and other public ownerships. Of the federally owned volume, two-thirds is on national-forest land, and one-third is on lands administered by the Bureau of Land Management.



Ownership class	Million bd. ft.	Percent
Private	5,303	38
Federal	6,604	48
State and other public	1,931	14
Total	13,838	100

Forest Utilization

Logging and sawmilling operations date from about 1850, when the first settlers arrived in Tillamook County. These early operations were on a small scale until, in 1911, the opening of a railroad between Portland and Tillamook changed the situation by providing an outlet for both logs and lumber. By 1933, 40,000 acres of green timber had been cut.

The Tillamook fire of 1933 and recurring fires in 1939 and 1945 drastically altered the forest utilization picture by killing 13 billion board-feet of old-growth timber. Since 1933, salvage logging of fire-killed trees in the county has been more important than harvesting of green timber.

Virtually all of the privately owned land in the Tillamook Burn reverted to the county for nonpayment of taxes. Some original owners entered into agreements with the county whereby they retained timber rights on the lands. In return for this, they paid a fee at time of harvest of $.05 per thousand board-feet for each year between the date of the agreement and the completion of logging. Much of the remaining salvage timber was later contracted to logging operators. A gradually decreasing supply of sawtimber in the Columbia River area of northwestern Oregon and southwestern Washington since the latter 1930's has provided markets for the killed timber on the Burn. During this time, there has also been a gradual lowering of merchantability standards for logs and this has resulted in repeated relogging operations for salvable material. Some areas in the Burn have been relogged three or four times. Large-scale salvage operations continue to the present day.

In 1952, sawlog production totaled 610 million board-feet. Of this, 447 million board-feet came from dead timber. During the period 1953 - 1955, salvage activity decreased somewhat, but still produced an average of 283 million board-feet of sawlogs per year. This amounted to 68 percent of the total annual average log production for Tillamook County during this period. Salvage logging of dead timber, therefore, has for some years been the major source of sawlogs in the county.

In recent years, an expanding pulp industry in the Pacific Northwest has created greater demand for the county's Sitka spruce and hemlock timber.

Growth studies indicate that the county's Douglas-fir, hemlock, and spruce stands are growing at rates exceeding regional averages. The combination of rapid growth rate, expanding markets, and excellent market accessibility holds promise of a bright future for the forest industries of Tillamook County.

Table 1.--Land area, by major class of land, 1955

Class of land	Area
	Acres
Forest:	
Commercial	665,950
Noncommercial:	
Productive-reserved	3,790
Unproductive	--
Total	669,740
Nonforest	52,980
All classes	722,720

Table 2. --Area of commercial forest land, by ownership and stand-size classes, 1955

(In acres)

Ownership class	Total	Sawtimber stands	Poletimber stands	Seedling and sapling stands	Nonstocked areas
Private	208,740	110,070	25,930	55,670	17,070
State	308,110	38,140	32,330	112,460	125,180
County	3,090	1,980	750	320	40
Municipal	2,480	810	910	740	20
Federal:					
Bur. of Land Mgt.	53,940	44,860	3,090	3,700	2,290
National Forest	89,500	80,070	5,000	2,730	1,700
Other[1/]	90	90	--	--	--
Total Federal	143,530	125,020	8,090	6,430	3,990
All ownerships	665,950	276,020	68,010	175,620	146,300

1/ Federal lighthouse reserve.

Table 3. --Area of commercial forest land, by major forest type and stand-size class, 1955

(In acres)

Forest type	Total	Sawtimber stands		Pole-timber stands	Seedling & sapling stands	Non-stocked areas
		Large[1/]	Small[2/]			
Douglas-fir	227,890	82,660	30,500	22,030	92,700	--
Hemlock--Sitka spruce	183,530	98,920	23,190	21,640	39,780	--
Fir-spruce	4,980	1,370	--	90	3,520	--
Lodgepole pine	2,100	--	310	1,360	430	--
Hardwoods	101,150	40	39,030	22,890	39,190	--
Nonstocked areas	146,300	--	--	--	--	146,300
Total	665,950	182,990	93,030	68,010	175,620	146,300

1/ 21 inches d.b.h. and larger.

2/ 11-20.9 inches d.b.h.

Table 4. --Land area by cover type, ownership class, and land-use class, 1955

(In acres)

Cover type and land class	Total unreserved and reserved	Unreserved								Reserved			
		Total	Private	State	County	Municipal	Federal: Bureau of Land Mgt.	Federal: National forest	Other 1/	Total	State	County	Federal (National Forest)
PRODUCTIVE FOREST LAND													
	Total	Commercial								Noncommercial (productive-reserved)			
Douglas-fir, large old-growth sawtimber (yellow fir)	9,420	9,370	4,640	1,300	20	--	3,020	390	--	50	50	--	--
Douglas-fir, large young-growth sawtimber (red fir)	73,240	73,190	10,650	6,850	180	--	23,200	32,310	--	50	10	40	--
Douglas-fir, small young-growth sawtimber (red fir)	30,510	30,500	7,000	3,870	100	--	8,210	11,320	--	10	--	10	--
Douglas-fir, poletimber	22,040	22,030	3,290	15,410	40	--	1,660	1,630	--	10	10	--	--
Douglas-fir, seedlings & saplings	91,950	91,820	18,700	69,870	100	50	2,130	970	--	130	130	--	--
Western hemlock, large sawtimber	63,360	62,100	35,650	12,540	550	570	4,220	8,570	--	1,260	980	40	240
Western hemlock, small sawtimber	18,860	18,860	9,010	4,970	380	110	1,790	2,600	--	--	--	--	--
Western hemlock, poletimber	20,290	20,260	11,490	6,890	80	820	430	550	--	30	--	30	--
Western hemlock, seedlings & saplings	38,680	38,390	23,350	12,450	--	630	960	1,000	--	290	290	--	--
Sitka spruce, large sawtimber	38,390	36,820	22,600	3,920	210	70	1,460	8,470	90	1,570	1,040	50	480
Sitka spruce, small sawtimber	4,330	4,330	3,360	190	70	--	90	620	--	--	--	--	--
Sitka spruce, poletimber	1,430	1,380	1,180	70	--	--	--	130	--	50	50	--	--
Sitka spruce, seedlings & saplings	1,470	1,390	1,120	50	10	--	10	200	--	80	80	--	--
Western redcedar, large sawtimber	100	100	100	--	--	--	--	--	--	--	--	--	--
Port-Orford-cedar, seedlings & saplings	880	880	70	750	--	--	60	--	--	--	--	--	--
True fir-mountain hemlock, large sawtimber	1,370	1,370	1,180	190	--	--	--	--	--	--	--	--	--
True fir-mountain hemlock, poletimber	90	90	20	70	--	--	--	--	--	--	--	--	--
True fir-mountain hemlock, seedlings & saplings	3,520	3,520	2,840	680	--	--	--	--	--	--	--	--	--
Lodgepole pine, small sawtimber	310	310	260	--	--	--	--	50	--	--	--	--	--
Lodgepole pine, poletimber	1,360	1,360	1,130	--	50	--	--	180	--	--	--	--	--
Lodgepole pine, seedlings & saplings	430	430	330	--	20	--	--	80	--	--	--	--	--
Hardwood, large sawtimber	40	40	30	--	--	--	--	10	--	--	--	--	--
Hardwood, small sawtimber	39,220	39,030	15,590	4,310	470	60	2,870	15,730	--	190	--	190	--
Hardwood, poletimber	22,890	22,890	8,820	9,890	580	90	1,000	2,510	--	--	--	--	--
Hardwood, seedlings & saplings	39,250	39,190	9,260	28,660	190	60	540	480	--	60	60	--	--
Nonstocked area, recently clear cut	6,420	6,420	4,580	520	--	--	20	1,300	--	--	--	--	--
Nonstocked area, clear cut before 1951	230	230	230	--	--	--	--	--	--	--	--	--	--
Nonstocked area, deforested by fire	139,660	139,650	12,260	124,660	40	20	2,270	400	--	10	10	--	--
Total	669,740	665,950	208,740	308,110	3,090	2,480	53,940	89,500	90	3,790	2,710	360	720
NONFOREST LAND													
Agricultural	42,650	42,650	42,080	370	30	--	70	100	--	--	--	--	--
Grass and brush	1,450	1,040	950	20	20	--	--	50	--	410	410	--	--
Open-nonvegetative	8,880	8,810	7,770	110	40	--	110	780	--	70	60	10	--
Total	52,980	52,500	50,800	500	90	--	180	930	--	480	470	10	--
ALL LAND													
Forest land:													
Commercial	665,950	665,950	208,740	308,110	3,090	2,480	53,940	89,500	90	--	--	--	--
Noncommercial (Productive reserved)	3,790	--	--	--	--	--	--	--	--	3,790	2,710	360	720
Total forest land	669,740	665,950	208,740	308,110	3,090	2,480	53,940	89,500	90	3,790	2,710	360	720
Nonforest land	52,980	52,500	50,800	500	90	--	180	930	--	480	470	10	--
Total all land	722,720	718,450	259,540	308,610	3,180	2,480	54,120	90,430	90	4,270	3,180	370	720

1/ Federal lighthouse reserve.

Table 5. --Area of commercial land, by forest-condition and ownership classes, 1955

(In acres)

Forest-condition class	Total	Private	State	County	Municipal	Federal		
						Bureau of Land Mgt.	National forest	Other 1/
Softwoods:								
Large sawtimber:								
Uncut	166,880	64,630	19,810	870	240	31,810	49,430	90
Residual	16,070	10,190	4,990	90	400	90	310	--
Total	182,950	74,820	24,800	960	640	31,900	49,740	90
Small sawtimber:								
Uncut	48,000	14,780	8,320	550	110	9,930	14,310	--
Residual	6,000	4,850	710	--	--	160	280	--
Total	54,000	19,630	9,030	550	110	10,090	14,590	--
Poletimber:								
On cutover land	15,370	10,160	4,650	40	--	230	290	--
On other	29,750	6,950	17,790	130	820	1,860	2,200	--
Total	45,120	17,110	22,440	170	820	2,090	2,490	--
Seedlings & saplings:								
On cutover land	27,630	23,210	2,840	10	20	20	1,530	--
On other	108,800	23,200	80,960	120	660	3,140	720	--
Total	136,430	46,410	83,800	130	680	3,160	2,250	--
Hardwoods	101,150	33,700	42,860	1,240	210	4,410	18,730	--
Nonstocked	146,300	17,070	125,180	40	20	2,290	1,700	--
Total	665,950	208,740	308,110	3,090	2,480	53,940	89,500	90

1/ Federal lighthouse Reserve.

Table 6.--Area of young-growth timber stands on commercial forest land; by stand-size class, species group, and stocking class; 1955

(In acres)

Stand-size class and species group	Well stocked	Medium stocked	Poorly stocked	Total
Large young-growth sawtimber:[1]				
Softwoods	72,480	710	--	73,190
Small young-growth sawtimber:[2]				
Softwoods	49,910	4,200	60	54,170
Hardwoods	36,940	1,910	180	39,030
Total	86,850	6,110	240	93,200
Poletimber:				
Softwoods	33,700	11,030	390	45,120
Hardwoods	17,630	5,140	120	22,890
Total	51,330	16,170	510	68,010
Seedlings and saplings:				
Softwoods	32,430	65,990	38,010	136,430
Hardwoods	7,200	23,000	8,990	39,190
Total	39,630	88,990	47,000	175,620
All classes:				
Softwoods	188,520	81,930	38,460	308,910
Hardwoods	61,770	30,050	9,290	101,110
Total	250,290	111,980	47,750	410,020

1/ 21 inches d.b.h. and larger. (In Tillamook County, includes only the stands classified and mapped as Douglas-fir large young-growth sawtimber type.)

2/ 11-20.9 inches d.b.h.

Table 7.--Net volume of live sawtimber and growing stock on commercial forest land, by ownership class, 1955

Ownership class	Live sawtimber		Growing stock
	Million bd.-ft., log scale, Scribner rule	Million bd.-ft., International 1/4-inch rule	Million cubic feet
Private	5,303	5,732	966
State	1,807	1,956	354
County	83	90	16
Municipal	41	45	8
Federal:			
Bur. of Land Mgt.	2,143	2,312	383
National Forest	4,456	4,857	780
Other[1/]	5	5	1
Total Federal	6,604	7,174	1,164
All ownerships	13,838	14,997	2,508

1/ Federal lighthouse reserve.

Table 8.--Net volume of live sawtimber and growing stock on commercial forest land, by stand-size class, 1955

Stand-size class	Live sawtimber		Growing stock
	Million bd.-ft., log scale, Scribner rule	Million bd.-ft., International 1/4-inch rule	Million cubic feet
Sawtimber stands	13,745	14,891	2,431
Poletimber stands	75	86	72
Seedling and sapling stands	13	14	3
Nonstocked areas	5	6	2
Total	13,838	14,997	2,508

Table 9.--Net volume of live sawtimber and growing stock on commercial forest land, by species, 1955[1/]

Species	Live sawtimber		Growing stock
	Million bd.-ft., log scale, Scribner rule	Million bd.-ft., International 1/4-inch rule	Million cubic feet
Softwoods:			
Douglas-fir	5,730	6,215	980
Western hemlock	4,333	4,679	820
Sitka spruce	2,476	2,624	394
Western redcedar	165	175	26
Lodgepole pine	10	11	10
Pacific silver fir	2/	1	2/
Total	12,714	13,705	2,230
Hardwoods:			
Red alder	1,109	1,275	275
Bigleaf maple	15	17	3
Total	1,124	1,292	278
All species	13,838	14,997	2,508

1/ In addition to the species shown, there are small quantities of other species, chiefly noble fir and grand fir.

2/ Less than 0.5 million.

Table 10.--Net volume of live sawtimber on commercial forest land, by diameter class and species group, 1955

(In million board-feet)

Diameter class (Inches d.b.h.) and log rule	Total	Douglas-fir	Western hemlock	Sitka spruce	Other softwoods	Hardwoods
11.0-20.9:						
Scribner rule	3,660	1,352	1,155	242	14	897
International 1/4-inch rule	4,120	1,569	1,247	257	16	1,031
21.0-30.9:						
Scribner rule	4,253	1,917	1,634	500	7	195
International 1/4-inch rule	4,596	2,071	1,764	529	8	224
31.0-40.9:						
Scribner rule	2,469	795	880	749	20	25
International 1/4-inch rule	2,637	842	951	794	21	29
41.0 and larger:						
Scribner rule	3,456	1,666	664	985	134	7
International 1/4-inch rule	3,644	1,733	717	1,044	142	8
All diameter classes:						
Scribner rule	13,838	5,730	4,333	2,476	175	1,124
International 1/4-inch rule	14,997	6,215	4,679	2,624	187	1,292

Table 11.--Net volume of all timber on commercial forest land, by class of material and species group, 1955

(In million cubic feet)

Class of material	Total	Softwoods	Hardwoods
Growing stock:			
Sawtimber trees:			
Sawlog portion	2,184	1,977	207
Upper stem portion	164	149	15
Total	2,348	2,126	222
Poletimber trees	160	104	56
Total growing stock	2,508	2,230	278
Other material:			
Sound cull trees	2	1	1
Rotten cull trees	5	5	1/
Salvable dead trees	44	44	--
Total other material	51	50	1
All timber	2,559	2,280	279

1/ Less than 0.5 million.

Table 12. --Average annual cut of live sawtimber[1/] and growing stock on commercial forest land, by species group, 1952-55

Species group	Live sawtimber						Growing stock		
	Timber products	Logging residue	Annual cut[2/]	Timber products	Logging residue	Annual cut[2/]	Timber products	Logging residue	Annual cut[2/]
	Thousand board-feet, log scale, Scribner rule			Thousand board-feet, International 1/4-inch rule			Thousand cubic feet		
Softwoods	135,866	13,260	149,126	146,056	14,254	160,310	23,629	2,379	26,008
Hardwoods[3/]	--	--	--	--	--	--	--	--	--
Total	135,866	13,260	149,120	146,056	14,254	160,310	23,629	2,379	26,008

1/ In addition, average annual cut of dead sawtimber for this period amounted to 282,792 thousand board-feet.

2/ Annual cut is the sum of timber products and logging residue.

3/ Hardwood cut insignificant.

FOREST SURVEY PROCEDURE

Procedures used in the second Forest Survey reinventory of the forests of Tillamook County were materially different from the procedures used in the initial inventory and first reinventory. This change in procedures accounts for some significant differences in both the forest-area and timber-volume statistics obtained. Therefore, a brief description of procedures used in each inventory is in order.

Initial Inventory

The initial inventory of the county's forests was conducted in 1933 by what is known as the "compilation method." In this method, existing information on forest types, timber cruises, and other pertinent data was collected from private timber owners and various public agencies. These data were checked in the field for reliability and, in case of timber cruises, were adjusted to the specifications and standards of Forest Survey. Forest-type and timber-volume data for areas not covered by existing information were obtained through intensive field reconnaissance. Timber-volume estimates for immature stands were determined from normal yield tables adjusted for site, age, and density of stand.

All land in the county was classified as either forest or nonforest. Forest land was further classified as commercial or noncommercial; the commercial forest land was still further classified by type, stand-size class, and--in the case of young-growth stands--by stocking and age classes. These types and classes were delineated on 1-inch-to-the-mile base maps of each township. These township type maps were then superimposed over ownership-status plats and dot-counted to obtain forest-type area statistics by ownership class. Type delineations on the township maps were traced on a base map of the county to form a county forest type map.

First Reinventory

The first reinventory, in 1942, included a complete revision of the forest type map of the county. For this revision, records of cutting and other forms of depletion since the original inventory were obtained from various sources and verified in the field by ground reconnaissance. Areas on which the type had changed due to cutting, restocking of cutover or burned-over land, or ingrowth of immature stands were remapped on the ground. Area statistics by forest types

were then recomputed on the basis of up-to-date ownership data and the revised forest type map.

Timber-volume estimates for mature sawtimber stands were based on cruise data collected during the original survey, adjusted for cutting and other depletion that had occurred during the interval between inventories. Volume estimates for immature stands were based on yield tables adjusted for site, age, and density of stand.

Second Reinventory

In the second reinventory, in 1955, the forest type map was again completely revised. This revision was accomplished through interpretation, classification, and field mapping on aerial photos covering all of the land area. In the mapping on aerial photos, types whose classification was difficult were examined more closely in the field. Likewise, species composition of mixed stands was checked on the ground. The use of aerial photos in mapping resulted in type delineations of much greater accuracy and detail than were possible through the ground reconnaissance employed in the initial inventory and first reinventory. In preparing the revised type map, delineations on the aerial photos were transferred to a 2-inch county base map through use of a photo projector. The new type map was then superimposed over a current ownership map of complete county coverage and a dot count made of forest type areas by ownership class.

Volume estimates of live sawtimber, growing stock, and salvable dead material were calculated by applying average per-acre volumes to the appropriate forest type acreages. The average per-acre volumes for sawtimber stands and poletimber stands were obtained through a sampling procedure in which the stands were measured on randomly selected plots. In the random selection of samples, each individual sawtimber or poletimber stand in the county had an equal chance of being selected. A sample consisted of a cluster of 3 one-fifth-acre circular plots spaced at 6-chain intervals. Intensity of the sampling was designed to produce a total estimate of volume in the county of a specified sampling accuracy set by Forest Survey.

Average per-acre volumes of sawtimber and poletimber trees in the overstory of seedling and sapling stands and on nonstocked areas were obtained through an aerial photo plot-sampling procedure. A large number of 1-acre photo plots was taken in a modified systematic-random pattern. By photo interpretation, estimates were made

of average number of trees per acre of both sawtimber and pole-timber size, average crown diameter, and total tree height. Gross volume of the average tree was obtained from photo volume tables and then adjusted for defect and breakage in order to obtain net volume.

ACCURACY OF 1955 REINVENTORY DATA

Forest Area

In the second reinventory of the forests of the county, in-place mapping of the forests and their classification by forest type, stand-size class, or condition class were done on the basis of 100-percent coverage. Thus no sampling error was involved. Errors due to techniques or judgment in the field and in office computation of data were possible, but difficult to evaluate. Throughout all phases of the work, close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

Timber Volume

For the live sawtimber volume, derived from sampling surveys, the chances are about 19 out of 20 that a 100-percent cruise, using the same specifications for tree size and merchantability, would be within plus or minus 14.4 percent of the reinventory's estimated total of 13,838 million board-feet, log scale, Scribner rule. On the same basis, the cubic-foot volume of growing stock from a 100-percent cruise would be within a range of plus or minus 10.7 percent. The volume estimates by species, stand-size class, or other subdivision have greater sampling errors than the county totals.

DIFFERENCES IN RESULTS OF INVENTORIES

Some of the differences between forest-type and timber-volume statistics resulting from the initial inventory and first reinventory, and those resulting from the second reinventory, are due to actual physical change such as cutting of stands, restocking of deforested areas, and ingrowth of stands into the next larger size class. Other differences are due to variations between inventories in the procedures used in interpretation and classification of forest conditions and in standards of utilization. Differences such as these preclude direct comparison of some of the statistics; comparison of other statistics is meaningful only after the statistics have been adjusted to common standards.

Forest Area

Forest-land area statistics resulting from the three inventories, classified by stand-size and condition classes, are shown in table 13.

Table 13. Comparison of forest area statistics, initial inventory and reinventories of Tillamook County

(Thousand acres)

Forest Area	Initial inventory (1933)	Reinventories	
		1942	1955
Sawtimber[1/]	286	205	279
Poletimber[1/]	54	83	68
Seedlings and saplings	22	101	177
Nonstocked	285	265	146
Noncommercial unproductive	2	2	0[2/]
All Forest Area	649	656	670

1/ 1933 and 1942 data adjusted to present stand-size class definition.

2/ Area reclassified as commercial.

With the exception of seedling and sapling stands and nonstocked areas, the acreages shown in table 13 have been adjusted to fit 1955 specifications and are comparable in that respect. The 1933 and 1942 poletimber acreages have been adjusted to include only stands comprised of trees 5.0-10.9 inches d.b.h. Similarly, sawtimber acreages have been adjusted to include all stands comprised of trees 11 inches d.b.h. and larger.

Seedling and sapling acreages for all three inventories include stands of trees 0-4.9 inches d.b.h., but the 1933 and 1942 acreages

do not include stands on areas that were clear cut in the 12 years previous to inventory; such areas were considered to be nonstocked. The 1955 seedling and sapling acreage does include all cutover areas, however recent, that were stocked at the time of reinventory. It therefore follows that acreages of nonstocked areas vary in a manner directly complementary to the differences in seedling and sapling acreages. The 1933 nonstocked acreage included 45,000 acres of recent clear-cut land and burn area; the 1942 acreage included 39,000 acres. The 1955 inventory found only 230 acres of recently clear-cut land in a nonstocked condition.

The reversion of agricultural areas to forest land largely accounted for the 21,000-acre increase in forest land acreage between 1933 and 1955.

Analysis of sawtimber acreages for the three inventories shows that large old-growth Douglas-fir stands decreased in area from 66,000 acres in 1933 to 26,000 acres in 1942 to 9,000 acres in 1955.

Timber Volume

The three estimates of sawtimber volume (million board-feet, log scale, Scribner rule) on commercial forest land are as follows:

Inventory	Total	Douglas-fir	Other species
1933[1/]	10,472	5,232	5,240
1942[1/]	6,979	2,893	4,086
1955	13,838	5,730	8,108

1/ Volume estimates adjusted to 1955 d.b.h. and top diameter limits.

The 1933 and 1942 volume estimates were based on adjusted private cruises and ocular estimates of old-growth timber and on yield-table values for young timber. The method used in making the independent estimate in 1955 is described in the section on FOREST SURVEY PROCEDURE (Second Reinventory). A calculated sampling error of this estimate is given in the section on ACCURACY OF DATA (Timber Volume). However, no statistical evaluation of the 1933 and 1942 estimates can be made.

Much of the difference in volumes may have been due to the variation in standards of utilization between inventories. The standards for Douglas-fir, western hemlock, and Sitka spruce were changed between surveys to recognize increased industrial use of these species. In 1955, volume tables were used that gave a materially greater volume for a tree of a given size than did the tables used in the 1933 and 1942 inventories. Other changes included lowering the minimum merchantable top diameter of sawtimber trees and reducing the minimum requirement of net sound volume in a sawtimber tree from 33-1/3 to 25 percent of gross volume.

One factor that increased the board-foot volume of sawtimber during the 13 years between inventories was forest growth--net growth in sawtimber trees and the ingrowth of poletimber trees into the sawtimber class. An offsetting factor--one that reduced the sawtimber inventory since 1933--was depletion due to timber cutting and various natural agencies such as forest insects, diseases, windthrow, and fire.

Because of the influence of these and possibly other factors, the two inventory estimates are not comparable and do not necessarily reflect a trend in the county's total volume of sawtimber.

DEFINITION OF TERMS

Land Area

Total Land Area

Includes dry land and unmeandered water surface.

Forest Land Area

Includes (a) land which is at least 10-percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in (a) have been removed to less than 10-percent stocking and which has not been developed for other use. Minimum area of forest land recognized in reinventory of the county is 10 acres.

Nonforest Land Area

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the county is 10 acres.

Forest Land Classes

Commercial Forest Land Area

Forest land that is producing, or is physically capable of producing, usable crops of wood, economically available now or prospectively, and that is not withdrawn from timber utilization.

Noncommercial Forest Land Area

Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land; and (b) incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Types

Forest Land Types

Forest land is typed on the basis of predominant species as indicated by cubic volume for sawtimber and poletimber stands, and number of trees for seedling and sapling stands, or on the basis of forest condition such as nonstocked cutover or burned-over land. Where none of the indicated species comprises 50 percent or more of a given stand, the stand is typed on the basis of plurality of cubic volume or number of trees. In classifying forest land by type, the minimum area recognized is 40 acres.

Commercial Forest Land

Major forest types. Local forest types are grouped into generalized types. The major forest types in Tillamook County are as follows:

Douglas-fir. Forests in which 50 percent or more of the stand is Douglas-fir.

Hemlock-Sitka spruce. Forests in which 50 percent or more of the stand is hemlock or Sitka spruce.

Lodgepole pine. Forests in which 50 percent or more of the stand is lodgepole pine.

Fir-spruce. Forests in which 50 percent or more of the stand is true fir or Engelmann spruce.

Hardwoods. Forests in which 50 percent or more of the stand is red alder, bigleaf maple, Oregon white oak, or other western hardwoods, singly or in combination.

Noncommercial Forest Land

Productive-reserved. Forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but which otherwise qualifies as commercial forest land.

Unproductive. Forest land incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Nonforest Land Types

Agricultural. Cultivated land or stump pasture.

Grass and brush. Grass or brush on nonforest land.

Open-nonvegetative. Includes barrens, tideflats, towns, and unmeandered water.

Tree Classes

Sawtimber Tree

Tree of commercial species, 11 inches d.b.h. or larger, that contains at least one 16-foot coniferous sawlog or one 8-foot hardwood sawlog to a variable top diameter never less than 8 inches inside the bark. Also, 25 percent or more of the gross board-foot volume must be free from rot or defect.

Poletimber Tree

Softwood or hardwood tree 5.0-10.9 inches d.b.h. of commercial species in which 25 percent or more of the gross cubic-foot volume is free from rot and defect.

Seedling and Sapling Trees

Live trees of commercial species less than 5 inches d.b.h. and of good form and vigor.

Cull Tree

Live tree of sawtimber or poletimber size that is unmerchantable, now or prospectively, because of defect, rot, or species.

Sound cull tree. Live tree of sawtimber or poletimber size which contains 25 percent or more of sound volume but will not make at least one merchantable log, now or prospectively, because of roughness or poor form.

Rotten cull tree. Live tree of sawtimber or poletimber size in which less than 25 percent of the total volume is sound.

Salvable Dead Tree

Standing dead or down tree that contains 25 percent or more of sound volume and at least one merchantable 16-foot coniferous or 8-foot hardwood log.

Stand-Size Classes

Sawtimber Stand

Stand of sawtimber trees having a minimum net volume per acre as follows: 5,000 board-feet, log scale, International 1/4-inch rule, in any species except hardwoods; 1,500 board-feet in hardwoods.

Large sawtimber stand. Stand in which the majority of the volume is in trees 21 inches d.b.h. or larger.

Small sawtimber stand. Stand in which the majority of the volume is in trees 11.0-20.9 inches d.b.h.

Uncut Sawtimber Stand

Sawtimber stand that is essentially undisturbed by cutting.

Residual Sawtimber Stand

Sawtimber stand in which over 10 percent of the volume has been removed and in which the residual volume amounts to 5,000 board-feet or more per acre for softwoods and 1,500 board-feet for hardwood stands.

Poletimber Stand

Stand failing to meet sawtimber-stand specifications but at least 10-percent stocked with poletimber and larger (5 inches d.b.h. and larger) trees and with at least half the minimum stocking in poletimber trees.

Seedling and Sapling Stand

Stand not qualifying as either sawtimber or poletimber stand but having at least 10-percent stocking of trees of commercial species and with at least half the minimum stocking in seedling and sapling trees.

Stocking

Stocking is the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. "Degree of stocking" is synonymous with "percent of growing space occupied" and means the ratio of actual stocking to full stocking for comparable sites and stands. Stocking may be measured in terms of number of trees, volume, basal area, cover canopy, or other criterion or combination of criteria.

Well-stocked stands. Stands that are 70 percent or more stocked with present or potential growing-stock trees.

Medium-stocked stands. Stands that are 40 to 70 percent stocked with present or potential growing stock trees.

Poorly stocked stands. Stands that are 10 to 40 percent stocked with present or potential growing stock trees.

Nonstocked areas. Areas that are 0 to 10 percent stocked with present or potential growing stock trees.

Timber Volume

Live Sawtimber Volume

Net volume in board-feet of live sawtimber trees of commercial species.

Scribner rule. The common board-foot rule used in determining log-scale volume of sawtimber in the Pacific Northwest.

International 1/4-inch rule. The standard board-foot rule adopted nationally by the Forest Service in the presentation of Forest Survey volume statistics.

Growing Stock

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4-inch top (of central stem) inside bark.

All-Timber Volume

Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4-inch top inside bark.

Tree Species

Tree species commonly found in Tillamook County include:

Softwoods: Douglas-fir (Pseudotsuga menziesii)
Western hemlock (Tsuga heterophylla)
Sitka spruce (Picea sitchensis)
Western redcedar (Thuja plicata)
Lodgepole pine (Pinus contorta)
Noble fir (Abies procera)
Grand fir (Abies grandis)
Port-Orford-cedar (Chamaecyparis lawsoniana)
Pacific silver fir (Abies amabilis)

Hardwoods: Red alder (Alnus rubra)
Bigleaf maple (Acer macrophyllum)

Timber Cut

Annual Cut of Live Sawtimber

The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from live sawtimber. The volume of timber products cut from live sawtimber.

Logging residues from live sawtimber. The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land and not converted to timber products.

Annual Cut of Growing Stock

The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from growing stock. The volume of timber products cut from growing stock.

Logging residues from growing stock. The net cubic-foot volume of growing stock cut or killed by logging on commercial forest land and not converted to timber products.

A13.66/
130

E4510
mk

EISE
CIN'TI

SD11
A452
Nos.116-130

AUTHOR U.S. Forest Service. Pacific Northwest Forestand Range
TITLE Exp. Sta.,
FOREST SURVEY REPORTS.

DATE DUE	BORROWER'S NAME
GAYLORD 45	